Section 13.1

6. (a) In $\mathbb{R}^2$ $x = 4$ represents a line parallel to the y-axis. In $\mathbb{R}^3$, $x = 4$ represents the set $\{(x, y, z)|x = 4\}$, the set of all points whose x-coordinate is 4. This is the vertical plane that is parallel to the yz-plane and 4 units in front of it.

(b) In $\mathbb{R}^3$, the equation $y = 3$ represents a vertical plane that is parallel to the xz-plane and 3 units to the right of it. The equation $z = 5$ represents the set of points that are simultaneously on both planes, or in other words, the line of intersection of the planes $y = 3, z = 5$. This line can also be described as the set $\{(x, 3, 5)|x \in \mathbb{R}\}$, which is the set of all points in $\mathbb{R}^3$ whose x-coordinate may vary but whose y- and z-coordinates are fixed at 3 and 5, repectively. Thus the line is parallel to the x-axis and intersects the yz-plane in the point $(0, 3, 5)$.

18. center $(1, -2, 0)$ and radius $\sqrt{21}/2$.

38. a sphere with center $(25/3, 1, -11/3)$ and radius $\sqrt{332}/3$.

Section 13.2

24. $< -\sqrt{6}, 2\sqrt{6}, \sqrt{6} >$

Section 13.3

2. $\sqrt{2}$

8. -2

14. the ventor's total revenue for that day

Section 13.4

2. $a \times b = 10i - 8j + 2k$

42. maximum of $|u \times v| = 15$, minimum =0.
As u rotates counterclockwise, $u \times v$ is directed in the negative z-direction (by the right-hand rule) and the length increases until $\theta = \frac{\pi}{2}$, in which case $u = -3i$ and $|u \times v| = 15$. As u rotates to the negative y-axis, $u \times v$ remains pointed in the negative z-direction and the length of $u \times v$ decreases to 0, after which the direction of $u \times v$ reverses to point in the positive z-direction and $|u \times v|$ iuncreases. When $u = 3i$ (so $\theta = \frac{\pi}{2}$) $|u \times v|$ again reaches its maximum of 15, after which $|u \times v|$ decreases to 0 as u rotates to the positive y-axis.

Section 13.5

16. (a) $x = 2 + t, y = 4 - t, z = 6 + 3t$
(b) On the xy-plane : $(0, 6, 0)$
On the yz-plane : $(0, 6, 0)$
On the xz-plane : $(6, 0, 18)$

30. $x + 2y + 4z = 35.$

Section 13.6

22. IV

24. III

26. I

28. V